REMARKS

Please reconsider the application in view of the following remarks.

As to the Merits

As to the merits of this case, the Examiner sets forth the following rejections:

Claim 1was rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's Admitted Prior Art** (AAPA) in view of **Kim et al.** (US 2002/0181554) further in view of **Hottinen et al.** (US 2005/0185734).

Claims 6 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's Admitted Prior Art** (AAPA) in view of **Kim et al.** (US 2002/0181554) further in view of **Hottinen et al.** (US 2005/0185734) as applied to claim 1 above, and further in view of **Hottinen et al.** (US 2005/0078761).

Claims 7-8 and 10 were rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's Admitted Prior Art** (AAPA) in view of **Kim et al.** (US 2002/0181554) further in view of **Hottinen et al.** (US 2005/0078761).

Each of these rejections is respectfully traversed.

Claim Rejections - 35 U.S.C. §103

Independent Claims 1 and 7

The Office Action has not established *prima facie* case of obviousness because the references, even when combined, do not suggest all of the claimed steps/elements.

Claim 1, as previously presented, is drawn to at least ... *the multipath characteristic measurement signal and data transmission signals are a signal array formed by a plurality of coefficient matrices each having row vectors that are orthogonal to one another within the matrices and which comprise at least one coefficient array that is common in the column direction or row direction; and the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array.*

Claim 7, as previously presented, is drawn to at least ... *forming, in the reception processing device, a matrix of an arbitrary length by selecting, from a plurality of orthogonal square matrices that comprise a common row vector or column vector, the common row vector or column vector and an arbitrary number of row vectors or column vectors that are orthogonal to the common row vector or column vector; forming, in the reception processing device, a multipath characteristic measurement signal array by multiplying each of the coefficient arrays of the common row vector or column vector by a multipath characteristic measurement signal; forming, in the reception processing device, a data transmission signal array by multiplying*

each of the coefficient arrays of the other row vector or column vector in the matrix by each of the plurality of data transmission signals; and rendering, in the reception processing device, the multipath characteristic measurement signal array and data transmission signal array a transmission signal.

On page 3 of the Final Office Action, the Office alleges that AAPA discloses "wherein the multipath characteristic measurement signal and data transmission signals (An and Bn Cn in Figure 16) are a signal array formed by a plurality of coefficient matrices that are orthogonal to one another (background art; page 2, lines 17-19) within the matrices and which comprise at least one coefficient array that is common in the column direction or row direction (page 2, lines 18-29; page 4, lines 13-20 and Figure 16 describes coefficients of matrix formed with multipath measurement signal An and plurality of data transmission signals)." (emphasis added).

Applicant submits that the Office has erred substantively as to the factual findings based on the teachings of AAPA. More specifically, in Figs. 16-17 of the present specification, AAPA explicitly discloses one orthogonal square matrix and NOT a plurality of orthogonal square matrices as recited in claims 1 and 7. Because one orthogonal square matrix is used, the number of data transmission signals contained in the data transmission signal array thus formed is at least p (see Fig. 17).

On the other hand, due to the plurality of orthogonal square matrices in the claimed invention, it possible to reduce the number of columns of the multipath characteristic measurement signal array and plurality of data transmission signal arrays thus formed. That is, the transmission wait time and reception processing time can be shortened and the reception-side device can be simplified.

Furthermore, since AAPA discloses one orthogonal square matrix, it necessarily does not teach or disclose a plurality of coefficient matrices **each** having row vectors that are orthogonal to one another within the matrices and **each of which** includes at least one coefficient array that is common in the column direction or row direction, and the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array.

Thus, contrary to the Office's assertion, Applicant submits that AAPA fail to disclose at least *the multipath characteristic measurement signal and data transmission signals are a signal array formed by a plurality of coefficient matrices each having row vectors that are orthogonal to one another within the matrices and which comprise at least one coefficient array that is common in the column direction or row direction; and the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array* as recited in claims 1 and 7.

On page 3, of the Office Action, it is acknowledged that AAPA does not disclose "**(1)** the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array, and **(2)** the multipath and data transmission signal received in the device are arrays with matrices having row vectors."

However, on pages 3 and 4 of the Final Office, the Office alleges that the item (1) above is disclosed by the Kim reference and the item (2) is disclosed by the Hottinen reference (US 2005/0185734) and the combination of AAPA, Kim and Hottinen renders the claimed invention obvious.

Applicant submits that the Office has also erred substantively as to the factual findings based on the teachings of Kim and Hottinen. More specifically, Kim discloses a constraint, where an inner product of a filter coefficient and a corresponding multi-path component is maintained as 1, is applied to a coefficient updating formula for an adaptive filter for each of multi-path components to obtain a channel estimation value that has substantially no bias, from an adaptive filter output signal. Kim further discloses <u>an NxL matrix</u> that includes the spreading codes of the targeted users for the multi-path components and an <u>NxN orthogonal matrix</u> wherein the NxL matrix is multiplied by the orthogonal NxN matrix to obtain another matrix (A matrix) (paragraph [0027], [0088]).

Also, Hottinen (US 2005/0185734), in particular, discloses block code for four transmit (Tx) antennas including pilot (control) bits. This code provides full diversity, and encodes 63 complex symbols with a processing delay of 64 (see also FIG. 5 and paragraphs [0253]-[0256]).

In contrast, in the claimed invention, for example, as illustrated in Fig. 2, a plurality of matrices Q1, Q2, ···, Qm, are q by q orthogonal square matrices and the matrices Q1, Q2, ···, Qm **each comprise a common row vector or column vector**. Further, Fig. 2 shows a case with a row vector **R (oblique line parts) is the common vector**. In Fig. 2, elements of other vectors ('+' or '-', for example) are indicated by a white circle sign. In each of the matrices Q1, Q2, ···, Qm, **although the row vector R is orthogonal to the other row vectors, the orthogonality between the row vectors between the respective matrices Q1, Q2, ···, Qm is not protected.** That is, the row vectors R in the respective matrices Q are orthogonal to the other row vectors in the matrices Q such that the row vector R of matrix Q1 is orthogonal to the other row vectors in matrix Q1 and the row vector R of matrix Q2 is orthogonal to the other row vectors in matrix Q2. However, the row vector R of a certain matrix Q is not limited to being orthogonal to the row vectors of other matrices such that the row vector R of matrix Q1 is not limited to being orthogonal to the row vectors in the other matrices Q2 to Qm and the row vector R of matrix Q2 is not limited to being orthogonal to the row vectors of the other matrices Q1 and Q3 to Qm.

In other words, neither Kim nor Hottinen disclose a plurality of coefficient matrices **each** having row vectors that are orthogonal to one another within the matrices and **each of which**

includes at least one coefficient array that is common in the column direction or row direction, and the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array.

In view of the foregoing, Applicant submits that AAPA, Kim and Hottinen (US 2005/0185734), alone or in combination, fail to disclose at least *the multipath characteristic measurement signal and data transmission signals are a signal array formed by a plurality of coefficient matrices each having row vectors that are orthogonal to one another within the matrices and which comprise at least one coefficient array that is common in the column direction or row direction; and the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array* as recited in claims 1 and 7.

Furthermore, Hottinen (US 2005/0078761) also does not remedy this deficit because it also discloses a matrix that includes at least one linear combination of two orthogonal space-time code matrices (paragraph [0017]) which can not be construed as same or similar to a plurality of coefficient matrices each having row vectors that are orthogonal to one another within the matrices and each of which includes at least one coefficient array that is common in the column direction or row direction, and the multipath characteristic measurement signal formed by the respective coefficient matrices is the same signal array formed by the one common coefficient array as in the claimed invention.

Because the proposed combination of the afore-cited references does not teach or suggest all of the claimed steps in claims 1 and 7, Applicant submits that claims 1-12 would not have been obvious over these references. Accordingly, Applicant requests that the rejection under 35 U.S.C. 103 be withdrawn.

Conclusion

The Claims have been shown to be allowable over the prior art. Applicant believes that this paper is responsive to each and every ground of rejection cited in the Office Action dated September 3, 2009, and respectfully requests favorable action in this application. The Examiner is invited to telephone the undersigned, applicant's attorney of record, to facilitate advancement of the present application.

If this paper is not timely filed, Applicant respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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